

AMENDMENTS

1 (currently amended)

A process for forming a patterned thin film structure on a substrate, comprising:
printing a pattern on the substrate using a strippable material ~~comprising~~ consisting essentially of a binder and 5-80% by weight of a re-dispersible particulate, the printed strippable material defining ~~an area on the substrate where the thin film structure is to be formed by comprising~~ a negative image of a decorative design to be formed on the substrate ~~using the thin film material~~, such that the printed strippable material is present in areas on the substrate where the thin film structure is not to be formed and the printed strippable material is substantially not present in the area on the substrate where the thin film structure is to be formed;
depositing a thin film of material on the patterned substrate; and
stripping the strippable material from the substrate;
whereby the strippable material and any thin film material formed thereon are removed by said stripping leaving behind the thin film structure formed on the substrate in the shape of said decorative design; and
wherein the substrate and the patterned thin film design formed thereon are suitable for use as an ~~in-mold decoration (IMD)~~ IMD decorated film.

2 (currently amended)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein the strippable material ~~comprises~~ consisting essentially of said binder and 10-60% by weight of said re-dispersible particulate

3 (currently amended)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein ~~the strippable material comprises~~ said binder is a water soluble or water dispersible polymer as a binder.

4 (original)

The process for forming a patterned thin film structure on a substrate as recited in claim 3, wherein said water soluble or water dispersible polymer is selected from the group consisting of polyvinyl alcohol, polyvinylpyrrolidone, polyvinyl pyridine, polyacrylic acid, polymethacrylic acid, polyacrylamide, polyethylene glycol, poly(ethylene-co-maleic anhydride), poly(vinyl ether-co-maleic anhydride), poly(styrene-co-maleic anhydride),

poly(butylene-co-itaconic acid), PEOX, polystyrene sulfonate, cellulose derivatives ~~such as hydroxyethyl cellulose, hydroxypropyl cellulose, methyl cellulose, carboxymethyl cellulose,~~ xanthan gum, gum Arabic, gelatin, lecitin, and their copolymers.

5 (withdrawn, currently amended)

The process for forming a patterned thin film structure on a substrate as recited in claim 3, wherein said water soluble or water dispersible polymer comprises a water dispersible polymer selected from the group consisting of water- or alkaline-dispersible waxes, polyolefin, ~~or~~ and acrylic latexes or dispersions.

6 (currently amended)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein ~~the strippable material comprises~~ said binder is a solvent soluble or solvent dispersible polymer ~~as a binder~~.

7 (original)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein the re-dispersible particulate is derived from silica, CaCO₃, CaSO₄, BaSO₄, Al₂O₃, TiO₂, hollow-spheres, non-film-forming latexes or dispersions, inorganic pigment, or organic pigment.

8 (currently amended)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein the re-dispersible particulate is a polymeric particle or a polymeric composite particle.

9 (currently amended)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein the strippable material further comprises an additive selected from the group consisting of surfactants, dyes, curing agents, and plasticizers; whereby the presence of said additive facilitates the stripping of the strippable material subsequent to the deposition of the thin film material.

10 (original)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein the step of stripping comprises using a solvent to remove the strippable material.

11 (original)

The process for forming a patterned thin film structure on a substrate as recited in claim 10, wherein the solvent is selected from the group consisting of water, aqueous solutions, alcohols, ketones, esters, ethers, amides, hydrocarbons, alkyl benzenes, pyrrolidones, sulfones, DMSO, and their mixtures and derivatives.

12 (withdrawn)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein the thin film material is non-conductive.

13 (withdrawn)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein the thin film material is semi-conductive.

14 (original)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein the thin film material is conductive.

15 (withdrawn)

The process for forming a patterned thin film structure on a substrate as recited in claim 14, wherein the conductive thin film material is a material selected from the group consisting of metals, metal oxides, and their alloys and multilayer composites.

16 (withdrawn, currently amended)

The process for forming a patterned thin film structure on a substrate as recited in claim 14, wherein the conductive thin film material is a metal selected from the group consisting of aluminum, copper, zinc, tin, molybdenum, nickel, chromium, silver, gold, iron, indium, thallium, titanium, tantalum, tungsten, rhodium, palladium, platinum and cobalt.

17 (withdrawn, currently amended)

The process for forming a patterned thin film structure on a substrate as recited in claim 14, wherein the conductive thin film material is a metal oxide or sulfide selected from the group consisting of indium tin oxide (ITO), indium zinc oxide (IZO), aluminum zinc oxide, gadolinium indium oxide, tin oxide, fluorine-doped indium oxide ~~or~~ and zinc sulfide.

18 (currently amended)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein the step of depositing ~~a~~ the thin film material comprises sputtering.

19 (withdrawn, currently amended)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein the step of depositing ~~a~~ the thin film material comprises vapor deposition.

20 (withdrawn, currently amended)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein the step of depositing ~~a~~ the thin film material comprises vacuum deposition.

21 (withdrawn, currently amended)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein the step of depositing ~~a~~ the thin film material comprises electroplating.

22 (withdrawn, currently amended)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein the step of depositing ~~a~~ the thin film material comprises electro-less plating.

23 (withdrawn, currently amended)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein the step of depositing ~~a~~ the thin film material comprises electroforming.

24 (withdrawn)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein the step of printing comprises flexographic printing.

25 (withdrawn)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein the step of printing comprises driographic printing.

26 (withdrawn)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein the step of printing comprises electro photographic printing.

27 (withdrawn)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein the step of printing comprises lithographic printing.

28 (withdrawn)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein the step of printing comprises gravure printing.

29 (withdrawn)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein the step of printing comprises thermal printing.

30 (withdrawn)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein the step of printing comprises inkjet printing.

31 (withdrawn)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein the step of printing comprises screen printing.

32 (withdrawn)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein the step of printing comprises stamp printing.

33 (original)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein the substrate comprises a plastic substrate.

34 (original)

The process for forming a patterned thin film structure on a substrate as recited in claim 33, wherein the plastic substrate comprises a portion of a roll of plastic substrate.

35 (currently amended)

The process for forming a patterned thin film structure on a substrate as recited in claim 34, wherein the process for forming a patterned thin film structure on ~~a~~the substrate is a component part of a roll-to-roll process for fabricating ~~a in-mold decoration~~ the IMD decorated film.

36 (original)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein the substrate comprises a polyethylene terephthalate (PET) film.

37 (original)

The process for forming a patterned thin film structure on a substrate as recited in claim 36, further comprising performing the following steps prior to forming the patterned thin film structure on the substrate:

treating or coating the PET film with a release agent or coating; and
coating the treated or coated PET film with a durable layer to provide oil and scratch resistance.

38 (original)

The process for forming a patterned thin film structure on a substrate as recited in claim 36, further comprising printing on the substrate a second decorative design using a printable material other than the thin film material.

39 (original)

The process for forming a patterned thin film structure on a substrate as recited in claim 36, further comprising coating the IMD decorated film with an adhesive to form an in-mold transfer film.

40 (original)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein the substrate comprises a polycarbonate (PC) substrate.

41 (currently amended)

The process for forming a patterned thin film structure on a substrate as recited in claim 40, further comprising coating the IMD decorated substrate-film with a thin protective layer.

42 (currently amended)

A process for forming a patterned thin film structure on a substrate, comprising:
printing on the substrate with a ~~printable~~-first material a pattern ~~that defines the area where the thin film structure is to be formed by comprising~~ defining a positive image of a decorative design to be formed on the substrate such that the ~~printable~~-first material is printed in the area where the thin film structure is to be formed, the ~~printable~~-first material being strippable using a first solvent;

overcoating the printed surface of the substrate with a second material that is not strippable using the first solvent;

stripping the first material away using the first solvent in a process that strips away the first material and ~~any portions of the second material formed on the first material without stripping away the portions of the second material formed directly on the substrate, such that the second material remains coated on the portions of the substrate where the first material was not present, thereby defining the boundaries of the thin film structure by comprising a negative image of the decorative design to be formed on the substrate such that the second material remains in the area where the thin film structure is not to be formed thereof such that the second material is not present in and the first material has been stripped from the area where the thin film structure is to be formed;~~

depositing a thin film ~~layer~~-material on the patterned ~~top surface of the substrate;~~ and
stripping to remove the second material and the thin film material deposited on the second material to form the thin film structure in the shape of the decorative design;

wherein the substrate and the patterned thin film ~~design~~ structure formed thereon are suitable for use as an ~~in-mold decoration (IMD)~~ IMD decorated film.

43 (currently amended)

The process for forming a patterned thin film structure on a substrate as recited in claim 42, wherein the first material repels the second material such that the second material fills in the areas of the substrate ~~between the areas~~ where the first material has not been printed without coating the areas where the first material is present.

44 (original)

The process for forming a patterned thin film structure on a substrate as recited in claim 42, wherein the first solvent is an aqueous solution or water.

45 (withdrawn)

The process for forming a patterned thin film structure on a substrate as recited in claim 42, wherein the first solvent is a non-aqueous solvent or solution.

46 (original)

The process for forming a patterned thin film structure on a substrate as recited in claim 42, wherein the first solvent is an aqueous basic solution, and the step of stripping the second material comprises using a second solvent comprising an aqueous acidic solution, an aqueous neutral solution, or water.

47 (original)

The process for forming a patterned thin film structure on a substrate as recited in claim 42, wherein the first solvent is an aqueous acidic solution and the step of stripping the second material comprises using a second solvent comprising an aqueous basic solution, an aqueous neutral solution, or water.

48 (original)

The process for forming a patterned thin film structure on a substrate as recited in claim 42, wherein the first solvent is an aqueous neutral solution or water and the step of stripping the second material comprises using a second solvent comprising an aqueous acidic solution or an aqueous basic solution.

49 (withdrawn, currently amended)

A process for forming a patterned thin film ~~structure~~ structures on a substrate, comprising:

printing a first pattern on a first surface of the substrate using a strippable material ~~comprising~~ consisting essentially of a binder and 10-60% by weight of a re-dispersible particulate, the first pattern of the strippable material defining ~~an area on the first surface of the substrate where a first thin film structure is to be formed~~ a negative image of a first thin

film structure to be formed on the first surface of the substrate;

depositing a thin film of ~~thin film~~ material on the patterned first surface of the substrate;

stripping the first pattern of the strippable material from the substrate;

printing a second pattern on a second surface of the substrate using a strippable material ~~comprising~~ consisting essentially of a binder and 10-60% by weight of a re-dispersible particulate, the second pattern of the strippable material defining ~~an area on the second surface of the substrate where a second thin film structure is to be formed~~ a negative image of a second thin film structure to be formed on the second surface of the substrate;

depositing a thin film of ~~thin film~~ material on the patterned second surface of the substrate; and

stripping the second pattern of the strippable material from the substrate;

whereby the first pattern of the strippable material, the second pattern of the strippable material, and any thin film material formed on either the first or the second pattern of the strippable material are removed leaving behind the first thin film structure on the first surface of the substrate and the second thin film structure on the second surface of the substrate;

wherein the first thin film structure comprises a first decorative design, the second thin film structure comprises a second decorative design, and the substrate and the patterned thin film ~~designs structures~~ formed thereon are suitable for use as an ~~in-mold decoration (IMD)~~ IMD decorated film.

50 (currently amended)

A process for forming ~~a~~ patterned thin film ~~structure~~ structures on a substrate, comprising:

printing a first pattern on a first surface of the substrate using a strippable material ~~comprising~~ consisting essentially of a binder and 10-60% by weight of a re-dispersible particulate, the first pattern of the strippable material defining ~~an area on the first surface of the substrate where a first thin film structure is to be formed~~ a negative image of a first thin film structure to be formed on the first surface of the substrate;

printing a second pattern on a second surface of the substrate using a strippable material ~~comprising~~ consisting essentially of a binder and 10-60% by weight of a re-dispersible particulate, the second pattern of the strippable material defining ~~an area on the second surface of the substrate where a second conductive thin film structure is to be formed~~ a negative image of a second thin film structure to be formed on the second surface of the

substrate;

depositing a thin film of material on the patterned first surface and on the patterned second surface of the substrate; and

stripping the first pattern and second pattern of the strippable material from the substrate;

whereby the first pattern of the strippable material, the second pattern of the strippable material, and any thin film material formed on either the first or the second pattern of the strippable material are removed leaving behind the first thin film structure on the first surface of the substrate and the second thin film structure on the second surface of the substrate; and

wherein the first thin film structure comprises a first decorative design, the second thin film structure comprises a second decorative design, and the substrate and the patterned thin film ~~designs-structures~~ formed thereon are suitable for use as an ~~in-mold-decoration~~ ~~(IMD)~~ IMD decorated film.

51 (currently amended)

The process for forming a patterned thin film ~~structure~~ structures on a substrate as recited in claim 1, wherein the step of stripping comprises using solvent to remove the strippable material.

52 (withdrawn)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein the step of stripping comprises using mechanical pressure to remove the strippable material.

53 (withdrawn)

The process for forming a patterned thin film structure on a substrate as recited in claim 52, wherein using mechanical pressure comprises brushing.

54 (withdrawn)

The process for forming a patterned thin film structure on a substrate as recited in claim 52, wherein using mechanical pressure comprises using a spray nozzle.

55 (withdrawn, currently amended)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein the step of stripping comprises:

applying an adhesive layer having a higher adhesive strength with respect to the thin film material and/or strippable material than the adhesive strength of the strippable material to

to the substrate; and

removing the strippable material and any thin film material formed thereon by peeling off the adhesive layer.

56 (withdrawn, currently amended)

The process for forming a patterned thin film structure on a substrate as recited in claim 1, wherein the step of stripping comprises:

applying an adhesive layer to the substrate after the ~~thin film deposition~~ depositing step; and removing the thin film material on the area with the ~~first printed strippable~~ material by peeling off the adhesive layer.

57 (withdrawn, currently amended)

~~The method of process for forming a patterned thin film structure on a substrate as recited in~~ claim 56, wherein the cohesion strength of the thin film material and the adhesion strength between thin film material and the substrate are stronger than any of the three forces: the cohesion strength of the strippable material, the adhesion strength between the thin film material and the strippable material, and the adhesion strength between the strippable material and the substrate.

58-68 (cancelled)